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LISTS OF SPECIES

Lizards from central Jatapú River, Amazonas, Brazil

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ABSTRACT: The present study reports an inventory of lizard species from a region at the central Jatapú River located in the state of Amazonas, Brazil. The lizard fauna was surveyed using three sampling methods: diurnal and nocturnal visual search, pitfall traps with drift fences, and incidental collections. We recorded 24 lizard species belonging to 18 genera and eight families. Non-parametric estimators of richness (Bootstrap, Chao 2, Jackknife 1, Ace) were used to estimate the percentage of total richness sampled. Expected species richness varied from 27 species estimated via Bootstrap to 30 species with Jackknife 1. The composition of the lizard fauna encountered in the rio Jatapú plot was compared with seven other published surveys carried out in the region of the Brazilian Guiana Shield. The composition of the Jatapú lizard fauna was most similar to FLOTA Faro (84%) and least similar to ESEC Grão-Pará Center (66%). There was no association between faunal similarity and geographic distance. The present species list contributes to our knowledge of lizards of the southern portion of the Guiana Shield in Brazil.

INTRODUCTION

The most up-to-date taxonomic compilation available indicates, that Brazil harbors 248 species of lizards (Bérnils and Costa 2012). From those, approximately 100 species are found in the Brazilian Amazon (Ávila-Pires *et al*. 2007).

Local richness of lizards in previously surveyed Amazonian rainforest sites located in the Brazilian section of the Guiana Shield, inventoried using pitfall traps with drift fences and diurnal and nocturnal visual searches, ranged from 15 to 24 species (*e.g*. Ávila-Pires *et al*. 2010; Ilha and Dixo 2010). In areas outside the Guiana Shield but within the Amazon biome, diversity ranges from 20 to 40 lizard species per area inventoried (*e.g.* Cunha *et al*. 1985; Nascimento *et al*. 1987; Zimmerman and Rodrigues 1990; Martins 1991; Vitt and Zani 1996; Vitt *et al*. 2008; Macedo *et al*. 2008; Ávila-Pires *et al.* 2009; França and Venâncio 2010; Mendes-Pinto and Souza 2011). One of the explanations for such differences in local richness, including endemic species, is that the Amazon basin is a mosaic of distinct phyto-physionomic regions observable at different geographic scales (Silva *et al.* 2005). An additional contributing factor is that different portions of the Amazon basin have different geological origins and different ages and thus different evolutionary histories (Wesselingh et al. 2010).

Although a number of studies have focused on Amazonian forest lizard species (*e.g.* Cunha *et al.* 1985; Nascimento *et al*. 1987; Martins 1991; Ávila-Pires 1995, 2009, 2010), knowledge of the group is still far from ideal (Rodrigues and Ávila-Pires 2005; Ávila-Pires *et al*. 2010; Peloso *et al*. 2011). The diversity of Amazonian lizard species is likely to be underestimated given that many areas of the Amazon basin remain poorly inventoried or are not inventoried at all (Bernarde *et a*l. 2011) and that high levels of cryptic diversity have been reported for groups distributed across the basin (*e.g.* Glor *et al.* 2001; Geurgas and Rodrigues 2010; Bergmann and Russel 2007). The tendency is, therefore, for diversity as well as for number of species to increase when new areas of the Amazon region are inventoried and taxonomy is properly assessed.

As parts of the Amazon forest have been and continue to be irreversibly lost even before basic surveys can be carried out (Queiroz *et al*. 2006), and considering that lizards are subject to environmental perturbations and degradation (Vitt *et al*. 2008; Sivervo *et al*. 2010), there is a need for studies and surveys in pristine areas of previously unsurveyed regions.

Faunal inventories in regions of the Brazilian Amazon that have not previously been surveyed provide information on basic natural history, ecology, geographic distribution. Furthermore, faunal inventories can provide material for analyses of biogeographic and phylogenetic patterns of the group, and thus provide essential data for decision-making regarding the prioritization of areas for the conservation of biodiversity (*e.g.* Capobianco *et al*. 2001; França and Venâncio 2010).

Here we provide a checklist of the lizard species found during an expedition to the central Jatapú River, Amazonas state, Brazil. We also provide comparisons of the species composition of this region with that found in seven other surveyed areas in the Brazilian portion of the Guiana Shield.

MATERIALS AND METHODS

Study Area

The inventory of lizard fauna was carried out at two sites located on opposite banks of the central Jatapú River, the principal tributary of the Uatumã River, and located approximately 250 km northeast of the city of Manaus, state of Amazonas. The two localities were São José do

Jabote (SJJ – 01°55′53″ S, 58°15′21″ W) on the left bank of the river and São João do Lago da Velha (SJLV – 02°1′31″ S, 58°11′24″ W) on the right bank of the river (Figure 1), both localities are in municipality of São Sebastião do Uatumã, state of Amazonas, Brazil.

A standardized grid was opened at each sampling site, composed of three parallel, 5.0 km trails separated by 1.0 km. The trails were opened approximately perpendicular to the river. Both sets of trails are located in a region of dense tropical forest (Radambrasil 1976).

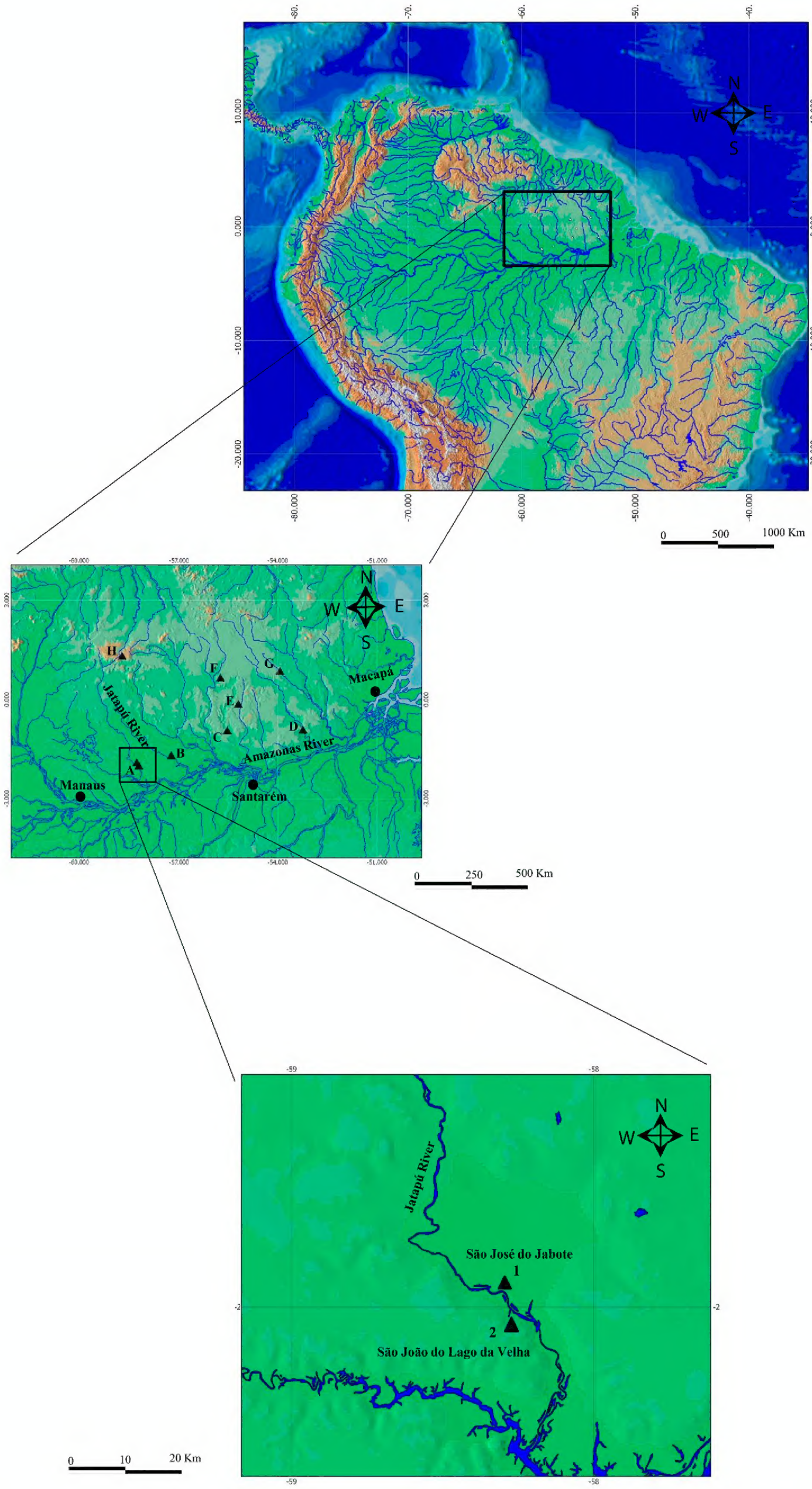

Figure 1. Some localities of the Guiana Shield cited on the text: A)Jatapú River; B) FLOTA Faro; C) FLOTA Trombetas; D) FLOTA Paru; E) ESEC Grão-Pará South; F) ESEC Grão-Pará Center; G) REBIO Maicuru; and H) ESEC Grão-Pará South. The area A is enlarged and shows the two areas studied: São José do Jabote and (1) São João do Lago da Velha (2).

The vegetation on the right margin grows on a quaternary alluvial terrain (paleo-várzea), with a flat, non-dissected terrain. It also contains seasonally inundated meadows and patches of dense campina forest. The right bank has a lower canopy, which allows greater sunlight penetration, a greater abundance of palms. The forest on the left bank has a taller canopy, with less penetration of sunlight and is situated on a highly dissected terra-firme terrain. The entire area is within the geologic formation known as the Guiana Shield.

The climate is pluvial equatorial (warm and wet), with predominant rains from November to April. Mean daily temperature is 28°C and mean relative humidity is 97.2%. Sampling was performed in September which marks the end of the dry season (May to September).

Data collection

Lizard species were sampled over 16 collection days in September 2011 (dry season), using three sampling methods: diurnal and nocturnal visual searches; interception and one meter deep pitfall traps (Cechin and Martins 2000; Ribeiro-Jr *et al*. 2008); and incidental collections (Sawaya *et al*. 2008).

Diurnal and nocturnal visual searches consisted of a researcher walking slowly along the trails, looking for specimens. Diurnal and nocturnal searches were performed by a pair of researchers along 1000 m stretches for approximately three (9 to 12 am) and five (7 to 12 pm) hours, respectively. Efforts were made to inspect all visually accessible microhabitats encountered along the trails (*e.g.*, fallen trunks, log cavities, arboreal vegetation, etc.).

The pitfall traps with drift fences consisted of a set of four 100 l receptacles buried in the soil (69 cm deep), placed 8 m equidistant from each other in a Y-shaped pattern. Pitfalls were interconnected by 80 cm high plastic drift fences that guided animals into the pitfall traps. Each set of pitfall traps with drift fences characterized one sampling station. A total of nine stations (36 receptacles) were deployed at the SJLV site. A total of seven stations (28 receptacles) were deployed at the SJJ site. Forest vegetation predominated at all stations, ranging from low to sloped to high (plateau) forest. All stations were positioned 500 m from each other and remained deployed from September 14 to 30, 2011. The pitfall traps were inspected daily.

Additional information resulted from capture and/or observations made by personnel involved in surveys of other taxonomic groups. This information was only considered for inclusion as a valid record when the specimen was collected or adequately photographed. Specimens of *Ameiva ameiva* and *Tupinambis teguixin* were also collected as by-catch in Tomahawk® traps deployed by the small mammal survey team. *Iguana iguana* was not collected, but sighted several times and counted among the species found in the region.

Some species such as highly arboreal, aquatic and fossorial species were not sampled in the area due to the nature of the sampling methods although likely present.

The collection and transport of the material were made under authorization by ICMBio / Sisbio (process 28976-1). The specimens were euthanized by overdose of the anesthetic 2% lidocaine hydrochloride and diethyl ether (cf. AVMA 2001). Small incisions were then made in the ventrum of each specimen for the purpose of removal of samples of liver and muscle tissue. The biological tissues were stored in cryotubes and preserved in 95% alcohol for future molecular analyses. Tissue samples were deposited in the tissue collection of the Laboratory of Evolution and Animal Genetics [CTGA - ICB/UFAM (CGEN, deliberation n°75 of Aug. 26, 2004)], Federal University of Amazonas and the tissue collection of INPA. After the removal of the tissue samples, the specimens were fixed in 10% formaldehyde injected into the body cavity and digestive tract (Franco and Salomão 2002) and after fixation preserved in 70% alcohol.

Vouchers were deposited at the Amphibian and Reptile Collection of the National Research Institute of the Amazon (INPA - H) and the Paulo Bürhnheim Zoological Collection of the Federal University of Amazonas (CZPB/UFAM), Manaus, Amazonas, Brazil (Appendix 1).

The nomenclature used in this study follows the list of Brazilian reptiles (Bérnils and Costa 2012), considering the recent changes proposed by Gamble *et al.* (2011) and Hedges and Conn (2012).

Statistical analyses

Efficiency of the sampling effort was evaluated using non-parametric estimators of species richness in the form of the estimators Bootstrap, Chao 2, Jackknife 1 and Ace. Analyses were performed in the EstimateS 9.1.0 program (Colwell *et al*. 2012). Whether or not sampling was sufficient was verified based on the accumulation of the number of species as a function of days of sampling using the above four indexes, and the estimator Mao Tau.

The composition of the lizard fauna encountered in the Jatapú River plot was compared with seven other published surveys carried out in the region of the Brazilian Guiana Shield. These survey areas were: *Floresta Estadual* (FLOTA) Faro (203 km from the area of the central Jatapú River), FLOTA Paru (494 km), FLOTA Trombetas (238 km), *Reserva Biológica* (REBIO) Maicuru (660,11 km) and the north (294 km), center (333 km) and southern (420 km) sectors of the *Estação Ecológica* (ESEC) Grão - Pará (Ávila-Pires *et al*. 2010). The study from Ávila-Pires *et al*. (2010) was chosen based on similarities in the sampling effort: all used pitfall traps with drift fences (which have considerable importance regarding the sampling of species with secretive habits, *e.g.* Gymnophthalmidae), had similar sampling durations and all localities are in the Brazilian portion of the Guiana Shield (see Table 1).

For the calculation of the faunal similarity with the seven localities, we adopted Simpson's equation two (2) (Simpson, 1960), which takes into consideration the possibility that sampling may not represent the full species richness of the sampled area. The formula is as follows: C / N_1 x 100; where C is equal the number of species found in common at both sites and N_1 is equal the number of species at the site with the smaller fauna, or presumably the more incomplete sample. The index is a percentage of the smaller fauna that is shared with the larger fauna.

To test if geographic distance had influence on the similarity of faunal compositions, we tested if geographic distance is correlated with the value of Simpson's equation 2 in the statistical package R vers. 3.0.2 (R Development

Core Team, 2013).

Results and Discussion

The lizard fauna of the central Jatapú River consists of 24 species in 18 genera and eight families (see Table 1). Photos of representative specimens are shown in Figure 2.

Gymnophthalmidae was the richest family in the region, with nine species, accounting for 39.1% (nine species) of the local richness, followed by Dactyloidae Fitzinger, 1843, Sphaerodactylidae Underwood, 1954, Teiidae Merrem, 1820 and Tropiduridae Bell *in* Darwin, 1843 (each with three species). The families Iguanidae

Table 1. Lizard species recorded in the study site and comparison of the lizard fauna of Jatapú with seven areas of the Brazilian Amazon located on the Guiana Shield sampled by Ávila-Pires *et al.* (2010). X indicates presence of a species, while for the Jatapú locality r, l and b indicates that the species was collected on the right, left and both margins of the river, respectively.

SPECIES NAME	JATAPÚ	FLOTA FARO	FLOTA TROMBETAS	GRÃO PARÁ NORTH	GRÃO PARÁ CENTER	GRÃO PARÁ SOUTHERN	REBIO MAICURU	FLOTA PARU
Dactyloidae								
Anolis auratus					X			
Anolis chrysolepis	b	X	X	X			X	
Anolis fuscoauratus	b	X	X	X		X	X	X
Anolis ortonii							X	
Anolis planiceps	b							
Anolis punctatus						X		
Gymnophthalmidae								
Alopoglossus angulatus	l						X	X
Amapasaurus tetradactylus			X	X				
Arthrosaura kockii				X			X	
Arthrosaura reticulata	b	X					X	X
Bachia flavescens	r	X	X	X	X	X	X	X
Bachia panoplia	r	X						
Cercosaura argulus							X	X
Cercosaura ocellata ocellata				X	X			X
Gymnophthalmus cf. *underwoodi*					X			
Iphisa elegans elegans	b			X		X		
Leposoma guianense	l	X	X	X	X	X	X	X
Leposoma percarinatum	r	X		X	X			X
Leposoma osvaldoi	r	X						
Neusticurus bicarinatus				X	X			
Neusticurus rudis				X				
Ptychoglossus brevifrontalis	r	X		X				
Tretioscincus agilis		X	X	X		X	X	X
Iguanidae								
Iguana iguana	b						X	
Phyllodactylidae								
Thecadactylus rapicauda	r			X		X		
Mabuyidae								
Copeoglossum nigropunctatum	b		X	X	X		X	X
Sphaerodactylidae								
Chatogekko amazonicus	r	X	X	X	X	X	X	X
Gonatodes annularis		X	X	X				
Gonatodes humeralis	l	X	X	X	X	X	X	X
Lepidoblepharis heyerorum		X	X				X	
Pseudogonatodes guianensis	r	X		X			X	
Teiidae								
Ameiva ameiva	b	X	X	X	X	X	X	X
Kentropyx calcarata	b	X	X	X	X	X	X	X
Kentropyx striata			X		X			
Tupinambis teguixin	b							
Tropiduridae								
Plica plica	l			X			X	X
Plica umbra	b	X	X	X	X	X	X	X
Uranoscodon superciliosus	r	X	X	X	X		X	X
Number of species	24	19	16	24	15	12	21	17
Number of species in common	-	16	11	17	10	10	16	14
Simpson's equation (2)	-	84%	69%	71%	67%	83%	76%	82%
Sampling days	16	15	16	18	22	16	17	16
Month of sampling	Sep.	Jan.	Apr.	Aug.-Sep.	Jan.	Jun.	Oct.-Nov.	Dec.
Season	dry	rainy	rainy	dry	rainy	rainy	dry	rainy

Gray, 1827, Phyllodactylidae Gamble *et al*. 2008 and Mabuyidae Mittleman, 1952 were each represented by only one species (Table 1).

Eleven lizard species were collected on both banks of the central Jatapú River. These were *Anolis fuscoauratus* D'Orbigny, 1837, *Anolis planiceps* Troschel 1848, *Anolis chrysolepis* Duméril & Bibron, 1837, *Ameiva ameiva* (Linnaeus, 1758), *Arthrosaura reticulata* (O' Shaughnessy, 1881), *Iguana iguana* (Linnaeus, 1758), *Iphisa elegans elegans* Gray, 1851, *Kentropyx calcarata* Spix, 1825, *Copeoglossum nigropunctatum* (Spix, 1825) sensu Nicholson *et al*. 2012 , *Plica umbra* (Linnaeus, 1758) and *Tupinambis teguixin* (Linnaeus, 1758). Nine lizard species were only collected from the right bank of the river, namely: *Bachia flavescens* (Bonnaterre, 1789), *Bachia panoplia* Thomas, 1965, *Chatogekko amazonicus* (Andersson, 1918) sensu Gamble *et al*. (2011), *Leposoma osvaldoi* Ávila-Pires 1995, *Leposoma percarinatum* (Müller, 1923), *Pseudogonatodes guianensis* Parker, 1935, *Ptychoglossus brevifrontalis* Boulenger, 1912, *Thecadactylus rapicauda* (Houttuyn, 1782) and *Uranoscodon superciliosus* (Linnaeus, 1758). Four lizard species were only collected from the left bank of the river, respectively: *Gonatodes humeralis* (Guichenot, 1855), *Leposoma guianense* Ruibal 1952, *Plica plica* (Linnaeus, 1758) and *Alopoglossus angulatus* (Linnaeus, 1758).

Differences in ecological parameters like richness and species composition can be expected as a response to natural variation in environmental factors across the landscape (*e.g.* Gordo 2003; Fraga *et al*. 2011). However some species recorded on only one of the banks of the Jatapu River have a wide distribution, and in other areas probably occur on opposite sides of the river. In this case, the recording of these species on one of the banks can be a random effect, and cannot be construed as a real pattern of distribution of these species. For example, *Plica plica* is widely distributed throughout the Amazon basin and occurs in habitats present on both banks of the Jatapú River plot, but we only collected it on the left bank of the river. Analogously, *Uranoscodon superciliosus* is typically found in areas near streams (riparian zones) or in flooded areas (Igapós), and exhibits considerable fidelity to this type of environment (Vitt *et al*. 2008). These habitats occur on both sides of the Jatapú River, but were present only on the right bank of the river in our plot, thus it is not surprising that we only collected this species on the right bank of the Jatapu. Both cases generate variance in the sampling and false absences, but the underlying source of this randomness is different.

The central Jatapú River seems to only restrict the geographic distribution of species of the genus *Leposoma*. The two species *Leposoma osvaldoi* and *Leposoma percarinatum* were recorded only on the right bank, while *Leposoma guianense* was recorded only on the left bank. The species *L. percarinatum* is widely distributed throughout the Amazon and likely also occurs on the left bank of the Jatapú River, despite not being recorded in the present survey. However, *Leposoma osvaldoi* and *L. guianense* seem to have allopatric distributions, with *Leposoma osvaldoi* being restricted to areas in and around the city of Manaus (identified as *Leposoma* sp. in Vitt *et al*. 2008) and *L. guianense* being typical of the Guiana Shield in the northeastern portion of the Amazon basin (not occurring in Manaus; Vitt *et al*. 2008). The limits of the distribution of both species are poorly known, especially the western limits of *L. guianense* and the eastern limits of *Leposoma osvaldoi*. In this geographic context, it is reasonable to suppose that the Jatapú River acts as a barrier to the distribution of these species. However, one cannot discard the possibility that this phenomenon may be explained by differences in the phyto-physiognomy between the sampling sites. To test this hypothesis, it would be necessary to sample a site belonging to the low plateau subregion of the Amazon on the right bank and a site belonging to the quaternary alluvia on the left bank of the Jatapú River.

The estimators of species richness resulted in between 27 and 31 of lizards for the sampled region of the Jatapú River. The Bootstrap estimator showed 27 expected species, while Chao 2 and Ace showed 29, and Jackknife 1 estimated 31 species. While all of the estimators demonstrated that stability in the species richness was not yet reached (Figure 3), the analyses demonstrated that the sampling effort corresponds to 80-88% of all species expected for this area of the Jatapú River.

Indeed, some lizard species not recorded in the present study are expected to occur in the region, such as: *Varzea bistriata* (Spix, 1825), *Neusticurus bicarinatus* (Linnaeus, 1758) *Tretioscincus agilis* (Ruthven, 1916), and *Uracentron azureum azureum* (Linnaeus, 1758), all species whose geographic distributions theoretically encompass the area of the central Jatapú River (Martins 1991).

In other inventories of the Brazilian Amazon, species richness varied from 20 to 34 species per surveyed region; for example: Carajás, Pará (n=20 species) (Cunha *et al*. 1985); Belém, Pará (n=20) (Nascimento *et al*. 1987); Balbina Hydroelectric Plant on the Uatumã River, Amazonas (n=20) (Martins 1991); Espigão do Oeste, Rondônia (n=29) (Macedo *et al*. 2008); Reserva Florestal Adolpho Ducke, Amazonas (n=34) (Vitt *et al*. 2008); Curuá Una, Santarém, Pará (n=22), Guajará-Mirim State Park, Rondônia (n=23); Scheffer Farm on the Ituxi River, Amazonas (n=26), Port Walter on the Juruá River, Acre (n=26) (Ávila-Pires *et al*. 2010); Boca do Acre, Amazonas (n=19) (França and Venâncio 2010); Rio Preto da Eva, Amazonas (n=20) (Ilha and Dixo 2010) and Trairão National Forest, Pará (n=23) (Mendes-Pinto and Souza 2011); Juruti, Pará (n = 33) (Prudente *et al*. 2013).

Summing all the lizard species of the seven inventoried Guiana Shield areas by Ávila-Pires *et al*. (2010) with our study area, we observed 39 lizard species; each area had between 12 and 24 species (Table 1). The northern portion of the ESEC Grão-Pará shared the greatest number of species with the Jatapú River (17 species), followed by Flota Faro and REBIO Maicuru (16 species respectively). FLOTA Paru shared 14 species, FLOTA Trombetas 11 species, southern portions of the ESEC Grão-Pará and the central portions of the ESEC Grão-Pará shared 10 species, respectively (Table 1). Species in common to all the areas were: *Chatogekko amazonicus, Gonatodes humeralis*, *Plica umbra*, *Ameiva ameiva*, *Kentropyx calcarata*, *Bachia flavescens* and *Leposoma guianense*. *Chatogekko amazonicus, Gonatodes humeralis*, *Ameiva ameiva* and *Kentropyx calcarata* area broadly distributed species in

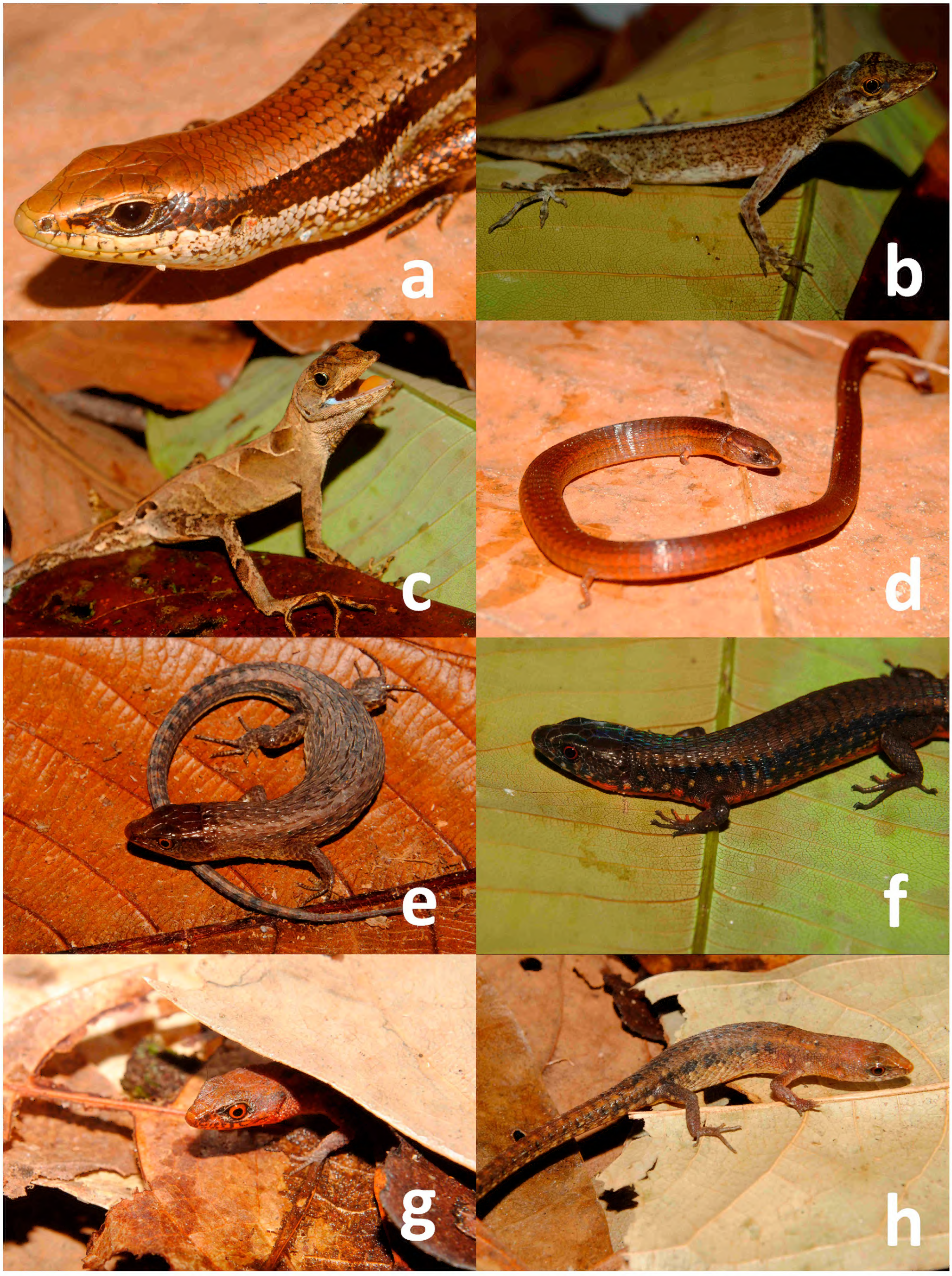

FIGURE 2. Some species of lizard from central Jatapú River (a) *Copeoglossum nigropunctatum* (b) *Anolis fuscoauratus*, (c) *Anolis chrysolepis*, (d) *Bachia panoplia*, (e) *Alopoglossus angulatus*, (f) *Arthrosaura reticulata*, (g) *Leposoma guianense* male, (h) *Leposoma guianense* female (Photos: S. M. Souza).

the Brazilian Amazon (Prudente *et al*. 2013). *Leposoma guianense* is considered an endemic of the Guiana Shield (Ávila - Pires *et al*. 2010; Cole *et al*. 2013).

Another interesting aspect is that some lizard species seem to define a group with distribution more restricted to locations to the southeast portion of the Guiana Shield. This pattern is defined for two species (*Leposoma osvaldoi* and *Bachia panoplia*), both recorded for the Jatapú River and with records to the west of the FLOTA Faro. There are no records of these two species further to the east, despite the fact that *Leposoma osvaldoi* has historically been confused with *Leposoma guianense* (S. M. Souza, unpublished data). Moreover, the two aforementioned species are also known for areas surrounding the city of Manaus (Vitt *et al*. 2008).

The similarity of the lizard fauna of the Jatapú River area and the seven localities of the Guiana Shield, based on Simpson's equation (2), varied from 84% to 66% (Table 1). The greatest similarity was observed with FLOTA Faro (84%), followed by ESEC Grão Pará Southern (83%) and Flota Paru (82%). Rebio Maicuru showed 76% similarity, ESEC Grão Pará North 70% while Flota Trombetas (68 %) and ESEC Grão Pará Center (66%) were least similar to the Jatapú locality (Table 1). However, there was no correlation between geographic distances of the sampled area, and their similarity as measured by Simpson's equation 2 (Kendall's tau = - 0.07632858, p = 0.5775).

The present study offers a broader knowledge on the biodiversity of lizards in an area of the Amazon not previously sampled. The tissues and specimens collected will allow answering questions involving the phylogeography, biogeography and community phylogenetics in future studies. Thus, studies of the evolutionary relationships between groups, and the patterns of distribution of organisms may be better investigated. Moreover, the herpetological collections of the National Research Institute of Amazônia INPA - H) and the Paulo Bürhnheim Zoological Collection of the Federal University of Amazonas (CZPB/UFAM) will be enriched with the inclusion of the collected specimens.

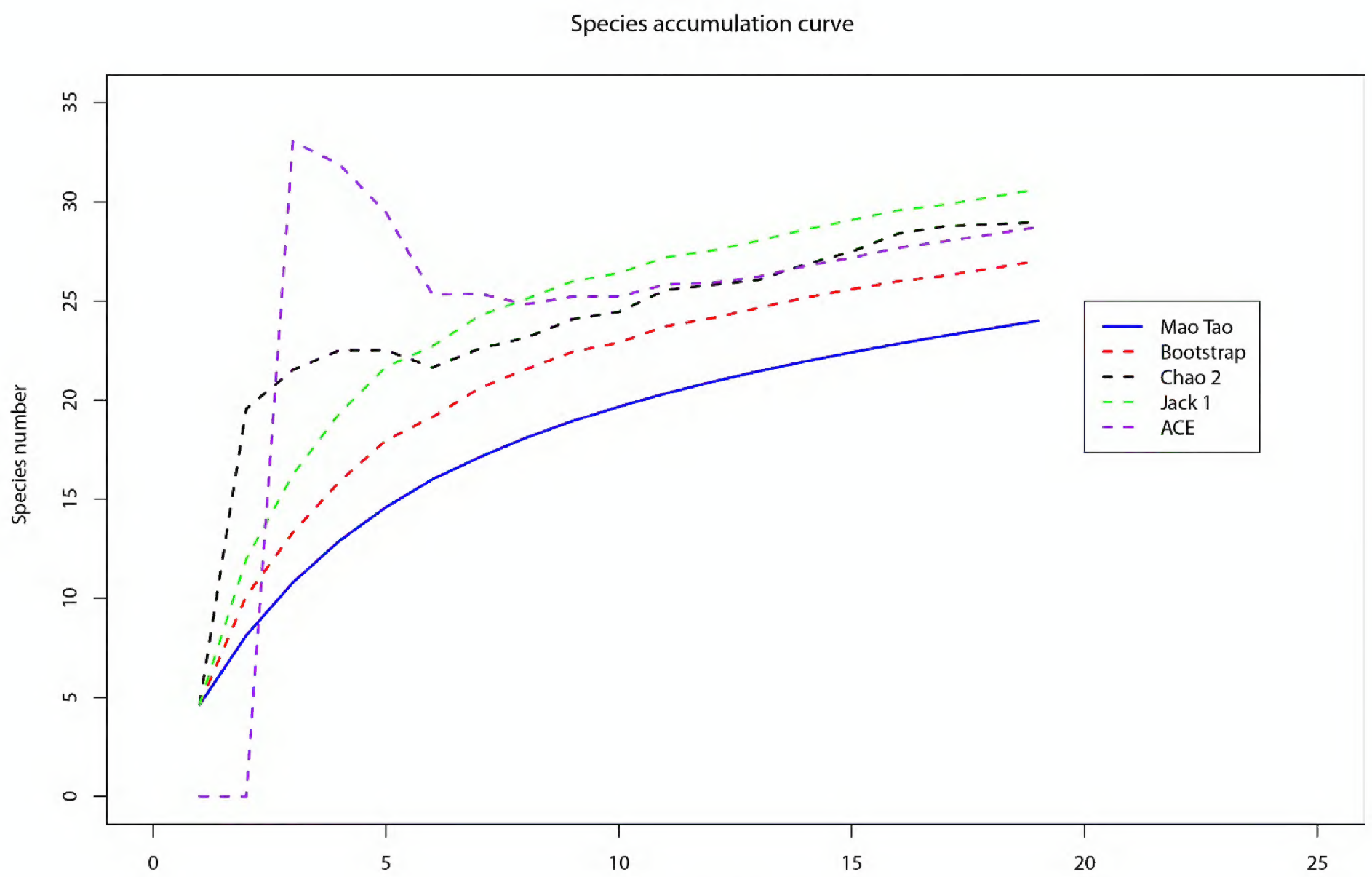

Figure 3. Sample-based species rarefaction curve for lizard species collected in the region of the central Jatapú River. The X axis is the number of collecting days, the Y axis is the estimate of the number of species collected. Number of species is estimated via the Mao Tau, Bootstrap, Chao 2, Jackknife 1 and ACE estimators.

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Appendix 1. Voucher specimens.
Anolis chrysolepis: INPA-H 31848, *An. fuscoauratus:* INPA-H 31854, *An. planiceps:* INPA-H 31856, *Alopoglossus angulatus:* CZPB 29-40, *Arthrosaura reticulata:* CZPB 21-25, CZPB 21-26, CZPB 25-34, CZPB 22-29, *Bachia flavescens:* CZPB 25-35, *Ba. panoplia:* INPA-H 31847, *Iphisa e. elegans:* CZPB 23-31, CZPB 22-30, CZPB 28-39, *Leposoma guianense:* INPA - H 31182 a 31189, *Le. percarinatum*: INPA-H 31178 a 31181, *Le.* cf. *osvaldoi*: INPA-H 31173 a 31177, *Ptychoglossus brevifrontalis:* CZPB 26-36, CZPB 26-37, *Thecadactylus rapicauda:* CZPB 32-44), *Copeoglossum nigropunctatum:* CZPB 21-27, CZPB 22-28, *Chatogekko amazonicus:* CZPB 24-32, CZPB 27-38, *Gonatodes humeralis:* CZPB 30-41, CZPB 30-42, *Ameiva ameiva* CZPB 33-45, *Kentropyx calcarata:* INPA-H 31712, *Tupinambis teguixin:* CZPB 34-46, *Plica plica:* CZPB 35-47, *Pl. umbra umbra:* CZPB 31-43, *Uranoscodon superciliosus:* INPA-H 31724.